February 26, 2004

Mr. Lew W. Myers
Chief Operating Officer
FirstEnergy Nuclear Operating Company
Davis-Besse Nuclear Power Station
5501 North State Route 2
Oak Harbor, OH 43449-9760

SUBJECT: DAVIS-BESSE NUCLEAR POWER STATION, UNIT 1 - ISSUANCE OF AMENDMENT RE: ONE-TIME EXTENSION OF STEAM GENERATOR TUBE INSERVICE INSPECTION INTERVAL (TAC NO. MC1573)

Dear Mr. Myers:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 262 to Facility Operating License No. NPF-3 for the Davis-Besse Nuclear Power Station, Unit 1. The amendment revises the Technical Specifications in response to your application dated December 16, 2003 (ADAMS Accession No. ML033530321), as supplemented January 29 (ML040340216) and February 13, 2004 (ML040490198).

This amendment revises the Technical Specifications to allow a one-time extension of the steam generator tube inservice inspection interval from March 9, 2004, until March 31, 2005.

A copy of the Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's next biweekly *Federal Register* notice.

Sincerely,

/RA by CLyon for/

Jon B. Hopkins, Senior Project Manager, Section 2
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-346

Enclosures: 1. Amendment No. 262 to License No. NPF-3
2. Safety Evaluation

cc w/encls: See next page

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ADAMS Accession Number: ML040580026 (Package)
ADAMS Accession Number: ML040440169 (Amendment)
ADAMS Accession Number: ML040570370 (Technical Specifications)

**SE dated 2/18/04 *previously concurred

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DATE	02/25/04	02/17/04	02/18/04	02/23/04	02/25/04	02/26/04

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FIRSTENERGY NUCLEAR OPERATING COMPANY

DOCKET NO. 50-346

DAVIS-BESSE NUCLEAR POWER STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 262
License No. NPF-3

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by the FirstEnergy Nuclear Operating Company (the licensee) dated December 16, 2003, as supplemented January 29 and February 13, 2004, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. NPF-3 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 262, are hereby incorporated in the license. FirstEnergy Nuclear Operating Company shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Anthony J. Mendiola, Chief, Section 2
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: February 26, 2004

ATTACHMENT TO LICENSE AMENDMENT NO. 262

FACILITY OPERATING LICENSE NO. NPF-3

DOCKET NO. 50-346

Replace the following page of the Appendix A Technical Specifications with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

Remove	Insert
3/4 4-8	3/4 4-8

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 262 TO FACILITY OPERATING LICENSE NO. NPF-3

FIRSTENERGY NUCLEAR OPERATING COMPANY

DAVIS-BESSE NUCLEAR POWER STATION, UNIT 1

DOCKET NO. 50-346

1.0 INTRODUCTION

By application dated December 16, 2003 (ML033530321), as supplemented by letters dated January 29, 2004 (ML040340216) and February 13, 2004 (ML040490198), FirstEnergy Nuclear Operating Company (the licensee) requested changes to the Technical Specifications (TS) for the Davis-Besse Nuclear Power Station, Unit 1 (Davis-Besse). The licensee requested a one-time extension to the steam generator tube inservice inspection interval specified within TS Surveillance Requirement 4.4.5.3.a. This surveillance requires that inservice inspections of steam generator tubes be performed at intervals of not less than 12 nor more than 24 calendar months after the previous inspection. Since the last inservice inspection of steam generator tubes was completed on March 9, 2002, this surveillance would require the next inspection to be completed by March 9, 2004. The proposed request would permit the licensee to delay their next steam generator tube inspections until March 31, 2005.

The supplements dated January 29, 2004, and February 13, 2004, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on January 6, 2004 (69 FR 695).

The proposed change would revise TS Surveillance Requirement 4.4.5.3.a, "Inspection Frequencies," to add a footnote to the inspection interval specifying "An exception applies for the interval following the March 2002 inspection completed during the Thirteenth Refueling Outage. Under this exception, the next inservice inspection may be delayed until March 31, 2005."

2.0 REGULATORY EVALUATION

The applicable Nuclear Regulatory Commission (NRC) regulations and guidance for review of the licensee's request to extend the operating interval between inspections include:

General Design Criterion (GDC) 14 of Appendix A to Title 10 of the *Federal Code of Regulations* (10 CFR) Part 50 requires that the reactor coolant pressure boundary be designed, fabricated, erected, and tested so as to have an extremely low probability of abnormal leakage, of rapidly propagating failure, and of gross rupture. Steam generator tubes represent the majority of the reactor coolant pressure boundary.

GDC 30 of Appendix A to 10 CFR Part 50 requires, in part, that components which are part of the reactor coolant pressure boundary are designed, fabricated, erected, and tested to the highest quality standards practical and that means are provided for detecting and, to the extent practical, identifying the location of the source of reactor coolant leakage.

GDC 32 of Appendix A to 10 CFR Part 50 requires, in part, that components that are part of the reactor coolant pressure boundary be designed to permit the periodic inspection and testing of important areas and features to assess their structural and leakage integrity.

Appendix B to 10 CFR Part 50, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," requires a quality assurance program to be applied to the design, fabrication, construction, and operation of structures, systems, and components in nuclear plants. The pertinent requirements of Appendix B apply to all activities affecting the safety-related functions of those structures, systems, and components. These activities include designing, purchasing, fabricating, handling, shipping, storing, cleaning, erecting, installing, inspecting, testing, operating, maintaining, repairing, refueling and modifying.

Regulatory Guide (RG) 1.121, "Bases for Plugging Degraded PWR Steam Generator Tubes," provides guidance for determining minimum wall thickness, beyond which the degraded tube should be plugged (i.e., plugging limits). RG 1.121 also provides performance criteria that recommend that the margin of safety against tube rupture under normal operating conditions should not be less than 3 at any tube location where defects have been detected. The margin of safety against tube failure under postulated accidents, such as a loss-of-coolant accident, steam line break, or feedwater line break concurrent with the safe shutdown earthquake, should be consistent with the margin of safety determined by the stress limits specified in Section III of the American Society of Mechanical Engineers (ASME) *Boiler and Pressure Vessel* Code.

In summary, the review of the licensee's request involves assessing whether the steam generator tube inspections performed at Davis-Besse in 2002 will ensure the structural and leakage integrity of the steam generator tubes consistent with the design and licensing basis of the facility until March 31, 2005.

3.0 TECHNICAL EVALUATION

3.1 Background

The fundamental goal of the steam generator tube inspection and repair criteria is to ensure that the structural and leakage integrity of the steam generator tube bundle is maintained for the period of time between the inspections. Structural integrity involves demonstrating the tubes are capable of withstanding the loadings specified in the ASME Code and RG 1.121. Leakage integrity involves demonstrating the dose consequences from steam generator tube leakage are acceptable per GDC 19 of 10 CFR Part 50, Appendix A, and 10 CFR Part 100. As a result, the NRC staff's review focused on whether the tube inspections performed by the licensee during their 2002 refueling outage are adequate in ensuring tube integrity for the period of time between inspections (i.e., from March 2002 through March 2005).

The licensee's proposal involves extending the 24 calendar month inspection frequency in TS Surveillance Requirement 4.4.5.3.a. by approximately 12 calendar months. For most of the first 24 calendar months since the previous steam generator tube inspections (which were

completed in March 2002), the licensee was in an extended shutdown. As a result, the steam generators were not exposed to the high temperature conditions generally required for corrosion-induced degradation of the steam generator tubes.

Davis-Besse has two Babcock and Wilcox once-through steam generators. The tubes are sensitized Alloy 600 in the mill annealed condition. Information pertaining to the last steam generator tube inspections, which were completed on March 9, 2002, was provided by the licensee in the following documents: March 22, 2002 (ML020850568), April 25, 2002 (ML021210583), March 31, 2003 (ML030930374), November 3, 2003 (ML033100370), December 17, 2003 (ML033560258), and January 7, 2004 (ML040090189). In addition, the NRC staff summarized conference calls it held with the licensee regarding their 2002 inspection in a letter dated May 22, 2002 (ML021410043).

3.2 Prior Inspection and Results

The scope and results of the licensee's 2002 inspections are discussed in the documents referenced above. In summary, the licensee performed a bobbin inspection of 100% of the inservice tubes and performed rotating probe inspections on a sample of tubes, at select locations. Rotating probe examinations were performed, in part, at the tube ends in the upper tubesheet (57%), at the roll expansions in sleeves (62%), on rolled plugs in the hot leg tubesheet (60%), at dents located at or above the 14th tube support plate (100%), at dents located below the 14th tube support plate (60%), and in the sludge pile region (500 tubes per steam generator).

Degradation mechanisms observed by the licensee during the 2002 outage included the following: axial and circumferential cracks in the tube ends in the upper tubesheet, volumetric indications in the tubesheet region, axial and circumferential indications at dents located above the 14th tube support plate, wear indications at tube supports, volumetric intergranular attack (IGA) indications in the tube freespan (primarily between the 3rd and the 7th tube support plate), and axial outside diameter stress corrosion cracking/intergranular attack in the tube freespan (commonly referred to as groove IGA). The licensee plugs or repairs all tubes with indications of degradation upon detection of those indications with the exception of degradation caused by wear. Indications of tube wear are sized and left in service in accordance with the plugging limit in the plant TS.

3.3 Water Chemistry During Layup

Along with tube material, operating temperature, and operating time, primary and secondary water chemistry also play a key role in steam generator tube degradation. As a result, the licensee evaluated its steam generator water chemistry program to support this amendment request. This evaluation was from the time of their last inspection until December 1, 2003 (a date just prior to their license amendment request) and included both the cold shutdown period and a brief period when the temperature was above 250 °F. The licensee concluded that chemistry control during the extended shutdown did not create conditions that would affect the integrity of the steam generators or their ability to perform their intended safety function. In addition, they committed to confirm within 30 days following plant restart that the layup and storage conditions of their steam generators subsequent to the time period assessed in their submittal did not create conditions that would affect the integrity of the steam generators or their ability to perform their intended safety function.

3.4 Tube Integrity Assessment

The licensee assessed the scope and results of their steam generator tube inspections and their tube repair hardware (e.g., tube plugs, sleeves, and rerolls) and concluded that structural integrity would be maintained during the extended period of operation and that adequate leakage integrity would be maintained during postulated accident conditions. Leakage integrity is ensured by demonstrating that the amount of primary-to-secondary leakage expected during postulated accident conditions is limited to 1.0 gallon per minute. Structural integrity is ensured by demonstrating that the tubes have adequate margins to failure consistent with the design and licensing basis of the facility. For example, the tubes must retain a safety factor of 3 against burst under normal steady state power operation primary-to-secondary differential pressure.

The licensee's tube integrity assessment included projecting through March 31, 2005 (the scheduled date of their next inspection), the number and severity of the various types of degradation mechanisms that they have observed based on previous results and industry experience. These assessments reflected that not all tubes were inspected with rotating probes in areas where degradation had been observed (e.g., in the upper tube ends). This assessment also included assessing the potential for cracks to occur in the tube end in the lower tubesheet (i.e., the cold-leg side of the steam generator) given recent industry experience in which indications in this region were detected (either no rotating probe inspections or a very limited number were performed in this region at Davis-Besse in 2002, which was consistent with industry practice at the time).

The staff reviewed the analysis performed by the licensee and performed some independent assessments to verify that tube integrity would be maintained until the next inspection. The staff also reviewed the licensee actions in response to recent experience at other once-through steam generators (e.g., actions in response to NRC Information Notice 2002-02, "Recent Experience with Plugged Steam Generator Tubes," and actions taken in response to finding degradation at Oconee Unit 2 (Oconee Licensee Event Report Number 2002-03)).

The staff's review confirmed that there is reasonable assurance that adequate structural and leakage integrity would be maintained. This conclusion was based, in part, on the extended shutdown period and the water chemistry during this period, the limited duration of operating time until the next inspection (i.e., less than a full cycle of operation), the results of the in-situ tests performed by the licensee during the 2002 outage, and operating experience at other facilities with once-through steam generators.

3.5 Proposed Changes to TS

TS Surveillance Requirement 4.4.5.3.a requires that inservice inspections of steam generator tubes be performed at intervals of not less than 12 nor more than 24 calendar months after the previous inspection. The licensee proposed to add a double-asterisked footnote to TS Surveillance Requirement 4.4.5.3.a which states:

> An exception applies for the interval following the March 2002 inspection completed during the Thirteenth Refueling Outage. Under this exception, the next inservice inspection may be delayed until March 31, 2005.

The staff finds that the proposed change is consistent with the technical basis of the proposed extension request and is, therefore, acceptable.

3.6 Conclusion

The licensee has performed inspections and assessments of the structural and leakage integrity of the steam generator tubes. In addition, they have assessed the chemistry conditions associated with the extended shutdown period as discussed above.

Based on the licensee's analyses as confirmed through independent assessments performed by the NRC staff, the NRC staff concludes there is reasonable assurance that steam generator tube integrity will be maintained until March 31, 2005. This conclusion is primarily based on the plant being in an extended shutdown period under conditions where corrosion-induced and mechanically-induced corrosion (i.e., wear) are considered relatively inactive with proper water chemistry control. The conclusion also considers the results of the prior inspection in which no safety significant degradation was found following a full cycle of operation. As a result of the above, the staff concludes that the licensee may incorporate the proposed changes into the Davis-Besse TS.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Ohio State official was notified of the proposed issuance of the amendment. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

This amendment changes a surveillance requirement. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluent that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration and there has been no public comment on such finding (69 FR 695). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

6.0 CONCLUSION

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: K. Karwoski

Date: February 26, 2004